CLAIMS

1. A radio wave-transmitting, wavelength-selective plate having Ag laminated on a transparent substrate, characterized in that a layer composed of Ag fine particles is formed and that a central portion of the Ag fine particles contains an alloy (hereinafter referred to as Ag alloy) formed of Ag and a metal forming a homogeneous solid solution (hereinafter referred to as homogeneous solid solution metal) with Ag.

2. A radio wave-transmitting, wavelength-selective plate according to claim 1, characterized in that a value obtained by multiplying the highest temperature of melting point of the Ag and melting point of the Ag alloy by 0.3 is lower than softening point of the transparent substrate.

3. A radio wave-transmitting, wavelength-selective plate according to claim 1 or 2, characterized in that average particle diameter L of the Ag fine particles is 100nm to 0.5mm and that a proportion of an area covered with the Ag fine particles on a surface of the transparent substrate is in a range of 0.2 to 0.8.

4. A radio wave-transmitting, wavelength-selective plate according to any one of claims 1 to 3, characterized in that the maximum value of light ray reflectance is in a wavelength range of 600nm to 1500nm.

5. A radio wave-transmitting, wavelength-selective plate according to any one of claims 1 to 4, characterized in that a dielectric layer is formed as an underlayer and/or top layer of a layer composed of the Ag fine particles.

6. A radio wave-transmitting, wavelength-selective plate according to any one of claims 1 to 5, characterized in that an electromagnetic wave is incident on a surface on which a layer composed of the Ag fine particles is formed and that a near infrared shielding coefficient (Es) defined in the formula (1) is 0.3 or greater,

$$E_s = \frac{\sum_{\lambda=680}^{1800} [R_{dp}(\lambda) I_{sr}(\lambda)]}{\sum_{\lambda=680}^{1800} [I_{sr}(\lambda)]} \qquad \cdots\cdots(1)$$

where λ is a wavelength of an electromagnetic wave incident on the film surface,

R_{dp} is a reflectance of the film surface at the wavelength λ, and

I_{sr} is an intensity of solar radiation at the wavelength λ when an air-mass is 1.5.

7. A method for producing a radio wave-transmitting, wavelength-selective plate according to claims 1 to 6, characterized in that a mixed film, in which the Ag and the homogeneous solid solution metal are mixed together, is formed on a transparent substrate, followed by a heat treatment of the mixed film, thereby forming a layer of the Ag fine particles on the transparent substrate.

8. A method for producing a radio wave-transmitting, wavelength-selective plate according to claim 7, characterized in that the number of the Ag fine particles per unit area is controlled by a film thickness of Ag and/or a film thickness of a metal forming a homogeneous solid solution and/or a film thickness of the mixed film.

9. A method for producing a radio wave-transmitting, wavelength-selective plate according to any one of claims 7 to 8, characterized in that an Ag layer is laminated on the Ag fine particles on the surface of the transparent substrate, followed by a heating treatment, thereby forming fine particles in which the Ag fine particles are surrounded by only Ag.

10. A method for producing a radio wave-transmitting, wavelength-selective plate according to any one of claims 7 to 9, characterized in that a particle diameter and an occupancy areal ratio of the Ag fine particles are controlled by the film thickness of the Ag layer and/or the number of the lamination of the Ag layer.

11. A method for producing a radio wave-transmitting, wavelength-selective plate according to any one of claims 7 to 10, characterized in that at least one method selected from resistance heating, gas burning heating, laser irradiation, electron beam irradiation and induction heating is used as a heating method in the heating treatment.

12. A method for producing a radio wave-transmitting, wavelength-selective plate according to any one of claims 7 to 11, characterized in that temperature of the transparent substrate in the heating treatment is 150°C or higher and is lower than softening point of the transparent substrate.

13. A method for producing a radio wave-transmitting, wavelength-selective plate according to any one of claims 7 to 12, characterized in that the mixed film, in which Ag and the homogeneous solid solution metal are mixed together, and the Ag film are formed by a DC magnetron sputtering.

14. A method for producing a radio wave-transmitting, wavelength-selective plate according to claim 4 or 5, characterized in that the dielectric layer is formed by a DC magnetron sputtering.